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CONCEPTUAL APPROACHES TO DEVELOPMENT OF MARINE MEDICINE IN ATLANTIC REGIONAL DIRECTION OF NATIONAL NAVAL POLICY OF THE RUSSIAN FEDERATION

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The paper represents fundamental principles of concept of development of naval medicine in one of six main regional directions of national naval policy of the Russian Federation — Atlantic regional direction that includes the Atlantic Ocean, rims of the Black Sea, Azov Sea, Baltic Sea and Mediterranean Sea. Attention is drawn to the notion of "Marine medicine", its role and place in national health care is argued. The necessity of practical implementation of the Convention of the International Labor Organization, ratified by the Russian Federation in 2012, No. 186 "On labor in maritime navigation", is primarily emphasized, first of all, the creation of national and regional centers of marine medicine, bringing various issues of medical provision of entities of the marine activity in line with international standards. The author notes that the problem of adaptation the national medical education to the international system of education in the field of maritime health care in the coming years will require the introduction of additions to the list of medical specialties and qualification requirements in the part related to marine medicine. It is on the basis of the national and regional centers of maritime medicine in the Russian Federation that it is proposed to organize training (postgraduate training, retraining) of the medical staff. It is noted that the Russian Federation, based on wide and positive experience of medical provision of seafarers in the Soviet Union, taking into account the organizational, scientific, methodological and practical features of the activities of the international centers of the marine medicine, will consistently and steadily develop the medical supply system of the state's marine power.

Key words: marine medicine, healthcare, national naval policy, concept of development, naval capacity, Atlantic regional direction, diving medicine, hyperbaric therapy, telemedicine healthcare services, naval aviation, radiological and marine hygiene, hospital ships.

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In addition to its federal component, the national maritime policy of Russia includes the following six main regional directions: the Atlantic, the Arctic, the Pacific, the Caspian, the Indian Ocean and the Antarctic ones.

The national maritime policy on the Atlantic regional direction is determined by the present-day conditions in this region, focused solely on the North Atlantic Treaty Organization (NATO), as well as by the imperfection of legal mechanisms for ensuring international security.

The basis of the national maritime policy in this direction is the solution of long-term tasks in the Atlantic Ocean, at the Baltic, Black and Azov seas, as well as at the Mediterranean Sea.

So, **in the Atlantic Ocean** such tasks are:

— ensuring an adequate naval presence of the Russian Federation in the region;

— development and building up the volume of sea transportation, fisheries, marine scientific research and the marine environment, geological exploration within the Russian exploration area for deep-water polymetallic sulphides under the Russian Federation contracts with the International Seabed Authority.

At the Baltic Sea:

— development of coastal port infrastructure, the renewal of commercial maritime and mixed (river-sea) navigation of vessels; the further development of the system of underwater pipelines, both in the interests of export and for providing energy to the Kaliningrad Region of the Russian Federation

— development of sea transport as one of the key elements of the regional specialization; the construction of a competitive ship structure;

— construction of logistic centers, as well as specialized port complexes for processing and transportation of hydrocarbons;

— ensuring transport accessibility for the Kaliningrad region; development of the ferry line in the direction of the seaports of Ust-Luga and St. Petersburg;
— development of the automobile-railway ferry complex linking the coastal territories of Russia to European countries;
— repair, modernization and construction of new facilities of the fishery industry, primarily the fishing fleet and the means of production of fish processing enterprises;
— creating the conditions for development of shipbuilding, ship repair, and ship equipment production;
— carrying out comprehensive scientific research, including monitoring the status of buried chemical weapons, potentially dangerous underwater objects, and the state of underwater pipelines;
— increasing importance of the coast-based tourist and recreational complexes located at the intersection of the leading European tourist routes; organization of cruise and yacht tourism;
— maintenance of marine natural and cultural-historical heritage on the basis of interaction between the public authorities and the local governments; preservation of any interested public associations and organizations;
— improving the quality of training in the system of higher and secondary vocational education in the field of the marine activities;
— formation of large scientific and innovative maritime centers on the basis of leading scientific institutions of the Russian Academy of Sciences, technological platforms, industry research institutes, as well as departments engaged in scientific activities in universities;
— creation of conditions for stable economic cooperation with the countries of the Baltic region; rational sharing marine natural resources; making confidence measures comprehensive in all the marine activities;
— and development of forces and troops, as well as basing system of the Baltic Fleet.

At the Black the Azov Seas, the basis of the national maritime policy is accelerated restoration and comprehensive strengthening of the strategic positions of the Russian Federation and maintaining the peace and stability in the region.

For these reasons, the following should be provided:
— establishing, on the basis of international maritime law measures, an international legal regime favorable for the Russian Federation of the Black and Azov Seas, the procedure for the use of aquatic biological resources, exploration and exploitation of hydrocarbon deposits, as well as laying and operation of subsea pipelines;
— international legal regulation of the regime and procedure for the use of the Kerch Strait;
— improving the composition and structure of the forces and troops of the Black Sea Fleet; their infrastructure development in the Crimea and on the coast of the Krasnodar Territory;
— construction of competitive ships of sea transport; updating of mixed (river-sea) navigation of ships; modernization and development of coastal port infrastructure; development of internal Black Sea ferry traffic;
— formation of marine economic centers of national and interregional designation on the basis of large agglomerations and the activation of the maritime component in the priority development zones (the Crimean, the Black Sea-Kuban, and the Azov-Don);
— ensuring compliance of the port capacity of the region with the projected growth in export supplies of energy resources taking into account development of the port and coastal infrastructure of the Crimea;
— further development of the export gas transmission system, including subsea pipelines;
— ensuring the transport accessibility of the Crimea; development of ferry lines in the direction of the Krasnodar Territory - Crimea;
— implementation of the transport and transit potential of the coastal territories of this regional direction through the development of international transport corridors;
— development of the shipbuilding and ship repair complex in the region taking into account the potential of the shipbuilding and ship repair enterprises of the Crimea; modernization of production and technologies in the shipbuilding of the region;
— carrying out comprehensive scientific research including monitoring the state and any changes in the marine ecosystems under conditions of an active anthropogenic impact; forecasting dangerous hydrometeorological, hydrophysical and seismological phenomena that pose a threat to the population of the coastal areas and the coastal zone, underwater pipelines and potentially dangerous underwater objects;
— carrying out geological exploration, updating available data on mineral deposits and the safe development of economically profitable deposits;
— development of commercial fish farming and personnel training in this area;

— development of tourism and recreation; development of the most famous seaside resorts followed by the spread of infrastructure investments in new resort centers on the coast; increase in the capacity of maritime transport links to ensure passenger traffic to the tourism development zone connecting the ports of the Crimea and the Azov-Black Sea basin to the Mediterranean cruise itineraries; development of multifunctional recreational complexes of international scale;
— preservation of marine natural and cultural-historical heritage on the basis of interaction between public authorities and local governments, interested public associations and organizations;
— creation of conditions, including with the involvement of the capabilities of the regions, for the basing and use of the components of the sea potential, ensuring the protection of the sovereignty, sovereign and international rights of the Russian Federation at the Black and Azov Seas.

At the Mediterranean Sea

— pursuing a focused course on turning the region into a zone of military-political stability and good-neighborliness;
— ensuring an adequate naval presence of the Russian Federation in the region on an ongoing basis;
— cruise shipping development from the ports of the Crimea and the Krasnodar Territory to the countries of the Mediterranean basin.

The tool for the implementation of the long-term objectives of the national marine policy of the Russian Federation is strengthening of the marine potential, which is based on the following four components:
1) the Russian fleet, which is a maritime transport, navy, fishing, research and specialized fleets, deep-sea forces and facilities of the Ministry of Defense, coast guard of the Border Guard Service of the Federal Security Service of the Russian Federation that provides all types of the fleets;
2) objects and means of exploration and extraction of fuel, energy, and minerals, in particular, mineral resources;
3) national shipbuilding arrangement;
4) and such an infrastructure, which ensures their functioning and development.

An integral part of this infrastructure is the maritime medical support system or, in other words, **the marine medical potential**, which, in turn, includes a number of health care authorities, medical organizations, medical educational institutions, some research institutes of a medical-biological profile, as well as tens of thousands of medical units at the marine activity facilities (ships, vessels, oil and gas facilities on the shelf, workshops of shipbuilding and ship repair enterprises, fish processing complexes, etc.).

However, the basis and the connecting thread of all components of the marine potential as well as its driving force is the human factor – a seaman, a member of professional staff in this or that maritime activity.

Sometimes in modern Russian reality we are confronted with a narrow understanding of the role and place of marine medicine. Some health care managers consider the marine medicine as such a maritime medicine, which is to be provided by the medical units on the ships and vessels at sea. And in this case, these so called ‘officials from health care’ rightly raise the question: “Why do we need the marine medicine?” Or they express their doubt regarding the need for the existence and development of the marine medicine, citing the fact that in Russia there is no such a notion as “the marine medicine”. Certain scientists, arguing about the need and feasibility of separating the marine medicine into a separate branch of health care, into a separate area of medical knowledge, consider the marine medicine as a medicine in marine transport. With such a narrowly focused “transporting” approach, of course, one can doubt the need for marine medicine development; so one can speak of the need to create some separate branches of health care in other types of transport: railway medicine, automobile medicine, etc.

In connection with these circumstances, we would like to clarify the situation and give reasoned response to these unfounded statements.

Firstly, on June 7, 2015, the President of the Russian Federation approved a new version of the “Marne Doctrine of the Russian Federation”. At the same time, the President of the Russian Federation paid his special attention to the fact that, for the first time, provisions of a medical and social nature were included in the document on the national marine policy.

Vladimir Putin, commenting on the significance of the new version of the “Marne Doctrine of the Russian Federation” for the state, said, *“For the first time, the doctrine includes provisions of a purely social nature. I am referring to **the marine medicine**, strengthening the health of seafarers, specialists in the maritime industry. This is a very important thing. People should know that in strategic documents on the development of the fleet and on development of the naval component the state will never continue to forget about the social component of these documents and will implement what people expect in their*

service when implementing the tasks faced by the state in this extremely complicated and important area."

Thus, the concept of the role and place of the marine medicine in the state, the provisions of the marine medicine governing various aspects of preserving life and health in the course of the country's marine activities have already been included in the strategic planning document approved by the President of the Russian Federation — a new edition of the "Maritime Doctrine of the Russian Federation" (Presidential Decree Of the Russian Federation dated June 17, 2015 No. Pr-1210).

These provisions are devoted to the development of the marine medicine, as one of the most effective ways to preserve the human potential of the marine industriy in Russia.

The adoption of the new edition of the "Marine Doctrine of the Russian Federation" has served as a catalyst and led to development of a number of strategic planning documents of the state in the field of the marine, including a naval, activity. And in all these documents the concept on the marine medicine is laid down, and its role, place and significance for the country are determined, and the vectors and stages of its development until 2030 are established.

So, the Basics of the state policy in the field of naval activities of the Russian Federation for the period up to 2030, approved by the Decree of the President of the Russian Federation dated July 20, 2017 No. 327 (article 29, item h), determine the main tasks of the state in the field of naval activities in the sphere of social security and the recruitment of the Navy and federal security service agencies — and this is the development of a system of medical support for servicemen and their families, civilian personnel of the Navy and Federal Security Service [1, p. 154].

The provisions of the marine medicine are laid down in the state strategic planning documents have not been approved yet, but they have been developed and are being developed, such as:

1) the Draft Federal Law "On State Administration of Marine Activities in the Russian Federation";

2) the project "Development Strategy for the Marine Activity in the Russian Federation until 2030";

3) the draft Federal Law "On Search and Rescue Support for the Marine Activities in the Russian Federation".

4) the project "Concepts of development of the marine medicine in the Russian Federation until 2030".

Secondly, there is no doubt that the Russian Federation, as a major world maritime power, must develop its marine health care in line with the world trends.

The Russian Federation carries out its marine activities in accordance with the international maritime law, guided with the international conventions adopted by the international community and ratified by the Russian Federation, including in the field of life and health protection at sea, particularly, in the maritime sectors of the national economy.

Thus, in 2012, the Russian Federation ratified the International Labor Organization (ILO) Convention No. 186 of 2006 "Maritime Labor Convention" (MLC). In accordance with the provisions of this international Convention, in the coming years we will have to make a qualitative breakthrough in our domestic marine health care.

In the world (in Europe, America, Asia, Africa, and Australia) there are many maritime states with a fleet engaged in maritime activities and developing the marinee medicine. In these countries, not only just a concept of marine medicine but also a well-structured system of medical support for seafarers has been formed; for many decades many large centers of the marine medicine have been functioning, which plays its role of clinics, scientific and methodological complexes as well as educational units. These centers also perform the functions of marine health management and advising ship doctors, including some telemedicine technology.

The presence of such centers of the marine medicine in each maritime power, which has ratified international conventions in the field of healthcare, is an indispensable condition for development of the maritime state in the 21st century.

Thirdly, in the Russian Federation a colossal experience in preserving and strengthening the health of seafarers was accumulated during the Soviet period. In the Soviet Union there was a coherent and clear system of marine health care, a network of basin hospitals and polyclinics functioned, a separate structural unit (water transport hygiene department) was active in the Ministry of Health, which performed the functions of administrative and operational management of medical institutions. The Scientific Research Institute of Water Transport Hygiene played a significant role in the scientific development and improvement of the forms and methods of medical and sanitary services for the crew. In this scientific institution, issues of professional selection of seafarers, hygienic improvement of vessels and ports, features of navigation regime in different geographic latitudes and standards for the organization of medical assistance to seafarers, that is, the scientific research institute successfully

performed the function of scientific and methodological support for the marine medicine, have been developed in detail [2, p. 24]. The disadvantage of the Soviet period was that the arrangements for marine health care extended only to water transport.

This positive experience of organizing medical support for seafarers at the state, regional, territorial and municipal levels in the new round of the history of domestic health care will undoubtedly be extremely useful. Of course, in modern conditions, this experience should be extended not only to sea transport, as an integral part of the Russian fleet, but also to all components of the Russian Federation's maritime potential: 1) the Russian fleet (sea transport, Navy, fishing, scientific research and specialized fleets (Gazflot, Atomflot, etc.), deep-sea forces and facilities of the Ministry of Defense, coast guard of the Border Guard Service of the Federal Security Service of the Russian Federation, providing types of fleets); 2) objects and means of exploration and extraction of fuel, energy and mineral resources and other minerals; 3) arrangements for the national shipbuilding and shipbuilding; 4) infrastructure ensuring their functioning and development.

Fourthly, the Russian Federation includes 85 equal consistent entities, 22 subjects of which are republics, 9 — territories, 46 — regions, 3 — cities of federal significance (Moscow, St. Petersburg, Sevastopol), 1 of them is an autonomous region, and the rest 4 ones are autonomous districts.

22 subjects out of these 85 consistent entities of the Russian Federation **are the marine entities**, so the heads of administrations of these entities are members of the Maritime Collegium under the Government of the Russian Federation. The length of the borders (including river and lake areas) by the land is 22.5 thousand km, while **by the sea — 40 thousand km.**

The state of health, as well as life expectancy of the population of the 22 coastal entities of the Russian Federation (amounted as much as tens of millions of people, including working and non-working population, children and pensioners), is influenced by the climate, the features of which are caused by the proximity of the sea and by the geographical position of the region. There is a marine climate in the extreme north-west of Russia, while there is a monsoon climate in the south of the Far East, there is an arctic and subarctic climate in the islands of the Arctic Ocean and northern continental regions, and there is an a subtropical climate in the Black Sea coast of the Caucasus as well as in the southern coast of Crimea.

At the present stage, it is quite obvious that the strategy and tactics of health care and the corresponding development of medical science must fully take into account the peculiarities of the climatic and geographical features of the regions of the industrial development and population living.

According to generally accepted ideas about climate as a mode of recurring weather conditions specific to a given area, stating a determination of the parameters characterizing these conditions requires specifying the area in question [3, p. 5–6; 4, p. 8].

This causes the influence of some medical and geographical features of the coastal regions of Russia and the climate features on the health status indicators, formation of the medical and demographic situation is the sphere of scientific and practical interests of the marine medicine.

The military and political leadership of the major maritime powers of the world attaches great importance to the climate considering not only the point of view of the marine medicine but also the climate change as a factor representing threats and risks for the country [5, p. 20].

From there, the marine medicine is a special branch of health care, designed to preserve and promote the health of entities of the marine activities that perform professional tasks at the facilities of the marine activities, as well as the population living in coastal areas. With that said, **the subjects of the marine activity** should be understood as any subjects (controls, organizations, enterprises, ships, vessels, their subdivisions, etc.), facilities and infrastructures of the marine potential, while **the entities of the marine activity** include people and their human potential directly involved in the study, development and use of spaces and resources of the oceans, that is those who work (or pass their military service) at the objects of the marine activities.

From the standpoint of the national maritime policy of the state, the marine medicine is such its element, the most important principle of which is preservation and protection of the labor resources of the country' marine potential, development of systems for monitoring the health status of workers at the facilities of the marine activities and the population of coastal regions of the Russian Federation.

Consequently, the marine medicine development is closely related to the strategic development of the domestic health care.

At the meeting of the Council under the President of the Russian Federation on strategic development and priority projects of July 13, 2016, healthcare was identified as a priority strategic development project of the Russian Federation until 2018 and for the period until 2025 [6, p. 21].

The Decree of the President of the Russian Federation of May 7, 2018 No. 204 “On the national goals and strategic objectives of the development of the Russian Federation for the period up to 2024” has expanded and specified significantly the tasks in the field of health care.

Large-scale work is being carried out, which is of a national nature, covering all regions of the country, including the Atlantic region.

The most important priority for the development of the health system in the Atlantic region in particular and in the country as a whole is **improvement of the maternity and infancy system**. By the end of 2018, the implementation of this program will further reduce infant mortality by at least 15% — to 5.5 per thousand live-born children, and maternal mortality by no less than 10% — to 9 per 100 thousand. In the future, it seems appropriate to extend this program as a whole to children’s medicine and to complete the construction of a three-level system of medical care for children aged 3 years and older, including the infrastructure of children’s clinics and hospitals [6, p. 22].

The priority for 34 constituent entities of the Russian Federation, including for certain areas of coastal entities of the Atlantic region, is to **increase the availability of medical care** in hard-to-reach areas with difficult climatic and geographical conditions, where there is no year-round traffic, and the settlements are far from those regional centers where the medical facilities providing specialized medical care are located.

Important in this matter is the interaction of the territorial disaster medicine centers in the republics, territories and regions of the Atlantic region with the medical service of the Baltic and Black Sea fleets through the territorial control centers of the Ministry of Defense of the Russian Federation.

Sanitary aviation is particularly relevant to increase the availability and timeliness of emergency medical care for citizens living in remote areas**.**

For this purpose, the Ministry of Health of the Russian Federation has provided additional funding from 2017 to 2019 in the amount of 10.2 billion rubles. The implementation of this direction in the development of domestic health care will increase the proportion of people living in remote areas hospitalized for emergencies during the first days of life-threatening cardiovascular diseases, as well as reducing mortality in acute myocardial infarction and acute cerebral circulation [6, p. 22].

Development of sanitary and aviation evacuation with the use of medical modules in the Armed Forces of the Russian Federation is successfully implemented in the framework of the Action Plan of the Main Military Medical Department of the Ministry of Defense of the Russian Federation for 2016-2020. Creating a system of sanitary and aviation evacuation has allowed to minimize the time of evacuation of patients with severe injuries, as well as transport patients with the provision of specialized medical care.

Work continues to be carried out addressing problematic issues related to improving the regulatory framework for provision of medical care during medical evacuation and to creating the units for the evacuation of patients in the structure of military medical organizations (MMO), as well as to increasing their technical equipment [7, p. 4].

Sanitary and air evacuation is closely connected with the territorial system of medical support, determined by the order of the Minister of Defense of the Russian Federation of 2016 No. 20, which makes it possible ensuring the optimal involvement of the MMO and maximally effectively carrying out medical support for the assigned contingents.

The territorial principle of medical support provides for the creation within the boundaries of a military district (fleet) the areas of responsibility for designating a basic MMO in each such zone and for fixing the military airfield closest to it with the assignment of tasks for implementing sanitary and aviation evacuation.

So, at the Atlantic direction in the Western Military District, sanitary and aviation evacuation is organized in 9 territorial zones of medical support (Kaliningrad, Pskov, Tver, Vologda, Smolensk, Nizhny Novgorod, Voronezh, Kostroma regions, and the Republic of Karelia), while in the Southern Military District — in 13 territorial zones of responsibility in combination with 4 separate areas of responsibility, combined into 3 territorial zones of medical care (Rostov, Vladikavkaz, and Crimea).

Each basic MMO is equipped with medical aircraft and (or) helicopter modules. For example, in the Baltic Sea basin, in St. Petersburg, the S. M. Kirov Military Medical Academy and the 442nd Military Clinical Hospital have been equipped with some medical aircraft modules, while the Branch Number 1442 of the Military Clinical Hospital in the city of Pushkin — with some helicopters. As for the Black Sea basin, medical aircraft and helicopter modules are used in Rostov-on-Don by the 1602nd Military Clinical Hospital and in Sevastopol by the 1472nd N. I. Pirogov Naval Clinical Hospital [7, p. 7–8].

The most important directions in the development of healthcare are: **provision of a modern level of training of medical personnel** based on professional standards, clinical recommendations (treatment

protocols); introduction of a new system of admission to professional activities; and elimination of personnel shortages in the industry.

The Ministry of Health of the Russian Federation envisages from 2019 to 2025 to provide additionally for these purposes the funding in the amount of 23.24 billion Russian rubles. Implementation of this program will uplevel the stuffing of the primary care with the physicians and increase the proportion of the persons who would have received their education as a part of their targeted training, and who would have been employed in medical or pharmaceutical organizations in accordance with the terms of the target contract. In addition, the proportion of the general practitioners receiving continuing vocational education will increase as well as the number of educational modules placed on the portal of continuing medical education of the Ministry of Health of Russia, and the proportion of the physicians admitted to professional activity through the accreditation procedure of specialists will increase as well [6, p. 22].

Despite the decisions taken by the Ministry of Health of the Russian Federation in 2016 on the strategic development of domestic health care until 2018 and for the period until 2025, the problem of providing medical personnel has acquired particular relevance and complexity in view of the tasks set by the President of the Russian Federation in his 2018 Federal Assembly Address. The Ministry of Defense of the Russian Federation is to focus on increasing the staffing of military medical units with qualified medical specialists for the next 6 years.

An extremely important task for the military medicine and the naval medicine as its part is completing to create the all-Russian public organization for developing the military medicine "Military Medical Society" in 2018. With regard to the Atlantic region, this task is relevant for the medical services of the Black Sea fleet and the Baltic fleet, as well as such military units and organizations of the Navy, which are stationed in the zone of responsibility of these fleets.

A particular problem for developing the national marine health care is the lack of trained medical specialists in the Russian marine medicine. Only a few Russian medical specialists have been trained in this specialty in the centers of the marine medicine in Norway (Bergen) and Spain (Cadiz); fewer of them have international certificates and some practice working for the international legal professional medical field.

For reference: in 1926, a USSR delegation led by N. A. Semashko took part in the International Sanitary Conference in Paris for the first time. The conference was attended by 200 delegates from 57 states. The conference adopted the International Sanitary Convention on the Protection of States against Epidemic Diseases and proposed a memorandum on arrangements for a medical service on board merchant ships. According to this document, highly qualified physicians should be employed on the ships of the merchant fleet, who would had been familiar with modern methods of prevention, diagnosis and treatment of, first of all, infectious diseases. The ship doctors should be examined in the same program for all nations in the Ministry of Health of their country and receive the diploma of a marine sanitary doctor. This diploma should be of international importance, that is, it must allow contacts of the doctors from different countries. The ship doctors should be independent of companies and shipowners. The ship's doctor should be created a certain position on the ship — as the person following the captain. Each ship should have a sanitary journal of the same type for all countries, which would record everything related to the health of the crew and passengers and the sanitary well-being of the vessel [2, p. 23-24].

Adaptation of domestic medical education to the international education system in the area of marine health in the coming years will require some additions to the list of the medical specialties and qualification requirements in relation to the marine medicine. Training (both postgraduate training and retraining) of the medical staff in the Russian Federation is to be organized on the basis of the national and regional centers of the marine medicine.

The most important direction in developing the domestic medicine, including in the Atlantic region, is a transition from the healthcare infrastructure information **to the widespread use of the digital technologies in its medical practice**. The Ministry of Health of Russia for these purposes from 2019 to 2025 provided funding in the amount of 3.99 billion rubles. Thanks to the modernization programs, a single secure medical data transmission network has been organized, and the federal components of the Unified State Health Information System (EUSHIS) have been developed.

The implementation of this direction in the development of domestic healthcare will allow increasing the proportion of citizens using the My Patient's Personal Account on the Unified Government Services Portal, increasing the share of public medical organizations and their structural subdivisions (with the exception of medical and obstetric centers, medical assistants' offices, and offices of general practitioners), which have implemented some medical information systems connected to the components of the EUSHIS involved in the electronic medical document management of the Russian Federation's

consistent entity. Further, the mortality rate for acute myocardial infarction and acute cerebral circulation disorders is to be reduced, the number of the doctors' workplaces equipped with computer equipment, connected to medical information systems of medical organizations and the EUSHIS components is to be increased, while the number of citizens applying to medical doctors for obtaining medical documents is to be reduced [6, p. 23].

An unresolved issue is storing the entire set of medical data in a bank. For the Black Sea and Azov basins of the Atlantic region, the creation of such a medical data bank, in our opinion, it is advisable to provide on the basis of the Medical Academy. S. I. Georgievsky Crimean Federal University. VI Vernadsky in Simferopol, for the South Baltic - on the basis of the Medical Institute of the Baltic Federal University. I. Kant in Kaliningrad, for the North Baltic - on the basis of the First St. Petersburg Medical University. Acad. IP Pavlov or the North-Western Medical University named after IM Mechnikov in St. Petersburg. With regard to the sailors of the Atlantic region, it is advisable to organize the storage of all medical data in the Military Medical Academy. SM Kirov in St. Petersburg.

In any case, the placement of the medical data bank of the Atlantic region at a medical university (academy, institute) will eliminate competition between major hospitals of the Russian Federation and will give an additional impetus to the system analysis of the health status of the population in coastal regions and development of university medical science.

Similar programs for the widespread use of digital technologies in medical practice are also being implemented in other ministries and departments, and large public joint-stock companies (such as PJSC Gazprom). Thus, in order to increase the efficiency of the medical support system of the Armed Forces, the Ministry of Defense of the Russian Federation is taking steps to create a single information space of the medical service, informatization of the medical service management bodies, and integrate the latest technologies of automated accounting and telemedicine into the activities of the military medical organizations. Equipping the military medical organizations and the military medical units with digital diagnostic technique and telecommunications facilities is a right way for carrying out remote monitoring of the seriously ill patient conditions, organizing telemedicine consultations and solving tasks related to the operational monitoring of the medical support of troops [8, p. 11–12; 9, p. 78–79; 10, p. 8–9; 11, p. 53–55].

In 2016–2017 the medical compartments of some military units of the Arctic zone (Kotelny Island, Wrangel Island, Alexandra Land Island, Cape Schmidt, and Alakurtti settlement) received the first telemedicine complexes within the framework of the state contract. Two telemedicine complexes with satellite communication terminals were placed in the medical detachments (for special purpose) of the hospitals at the Western (1586th Military Clinical Hospital located in Podolsk) and the Southern (1602nd Military Clinical Hospital located in Rostov-on-Don) military districts. In the S. M. Kirov Military Medical Academy (St. Petersburg) modern server and telecommunications equipment has been deployed. During 2017, the specialists from this Academy in co-operation with their colleagues from the Central Military Medical Organizations (Moscow) had been conducting more than 50 emergency and planned telemedicine consultations. In 2018, it was planned to equip with telemedicine complexes 8 military medical organizations and military medical units of the Eastern Military District (Kuril Islands, Sakhalin Island), the Northern Fleet (Island of Novaya Zemlya), and the Central Military District.

The issue of prospective equipping hospital ships, ships of the 1st and the 2nd ranks, as well as ocean research ships participating in voyages around the world for the past 3 years is being worked out. On the basis of the leading central and district clinical hospitals, it is planned to form a geographically distributed network of 7 regional consultation points, whose specialists are to provide methodological and consultative support to the medical specialists of both basic hospitals and the military unit. These items will be the "supporting" ones for further informatization of the medical service.

Purposeful activities to introduce and further improve medical information technologies at all levels of the medical service are dedicated to allowing by 2019:

— access of the medical specialists to the medical data of any patients regardless of the place of their examination and treatment;

— improve the quality and availability of the medical care;

— optimize the cost of its provision;

— reduce the time for making sound management decisions.

In addition, in 2017, on the basis of a multidisciplinary clinic of S. M. Kirov Military Medical Academy, a center for coordinating medical support was created to solve the tasks of monitoring medical support activities, coordinating organ donation issues and conducting telemedicine consultations, and organized round-the-clock duty at this center of specialists of the Academy.

As an experiment, in 2017, together with the interested central military administration bodies, a pilot area was developed between the Main Military Medical Directorate of the Ministry of Defense of the Russian Federation (Moscow), the medical service of the Western Military District and the next military medical organizations: S. M. Kirov Military Medical Academy, 442nd Military Clinical Hospital and its branch number 10 (35th Naval Hospital) in Kronstadt Island (all of them are located in St. Petersburg). In this experiment, the Center for the Coordination of the Medical Support of S. M. Kirov Military Medical Academy is assigned by the Federal Executive Bodies Authorities with the role of the organizer of information interaction; so that this Center is entrusted with the tasks of testing and probing some multi-platform medical information systems and specialized software as well as determining the best options for interaction on military health issues, including the National Defense Management Center of the Russian Federation [8, p. 13].

In the future, after founding the National Center of Marine Medicine (St. Petersburg) and the regional centers of the marine medicine, one of the important tasks of these centers should be to establish interaction with the Center for Coordinating Medical Support of S. M. Kirov Military Medical Academy, the National Center for Defense Management of the Russian Federation, federal executive authorities, and executive authorities in 22 coastal regions of the Russian Federation.

An important direction in the development of national health care, particularly in the Atlantic region, is **to increase the availability** of modern and high-quality **medicines** for population of the Russian Federation by improving the system for monitoring implementation of their purchases for state and municipal needs and for their turnover, including planned introduction of automated preferential drug supply systems, which will not only improve the management of trading stocks of the medicines, but also make it more targeted and comfortable for each person.

In order to increase the level of cooperation in the field of human potential preservation in the coastal regions of Russia, at both the federal and regional levels, in 2015, a section "Marine Medicine" was created in the scientific expert council of the Marine Board under the Government of the Russian Federation.

To ensure the implementation of the Marine Doctrine, the preparation of **the Concept of the Development of Marine Medicine of the Russian Federation until 2030** has been identified as **a priority task** in the field of preserving human potential.

The main approaches laid down in the draft Concept for the Development of the Marine Medicine in the Russian Federation until 2030 (hereinafter referred to as the Concept) were supported by the Marine Collegium under the Government of the Russian Federation at the joint meeting of the Presidium of the State Commission on Development of the Arctic and the Marine Collegium under the Government of the Russian Federation on September 28, 2016 in St. Petersburg.

The final draft of the Concept was approved by the Marine Collegium under the Government of the Russian Federation on April 28, 2018 and in the near future is to be sent for consideration and approval to the federal authorities concerned and the heads of 22 coastal regions of Russia, including the heads of the Republic of Crimea, Petersburg and Sevastopol, Leningrad and Kaliningrad regions correspondingly. By the end of 2018, the Concept will be submitted to the Prime Minister of the Russian Federation in accordance with the established procedure.

In accordance with the accepted conceptual approaches, considerable attention is paid to development of the marine medical potential, particularly in the Atlantic region. The main task is to create a national center of the marine medicine of the coastal entities of the Atlantic region of the Russian Federation and such regional ones, which are closed to the national one.

The Ministry of Health of Russia for the Black Sea and Azov basins has preliminarily been considering its approach on creating such a regional center for the marine medicine in the city of Novorossiysk (Krasnodar Territory) on the basis of the medical clinical center of the Federal Medical-Biological Agency (FMBA), as well as the National Center for Marine Medicine based on the FMBA's research institute for Industrial and Marine Medicine and the 122nd Industrial Hospital in St. Petersburg. In the Baltic Sea basin (the South Baltic and the Northern Baltic), creation of such centers has not been provided by the Ministry of Health of Russia by the moment.

In our opinion, it looks rather insufficient to establish just only one regional center of the marine medicine in the city of Novorossiysk for the largest Atlantic region. The centers of the marine medicine in the interests of the above-mentioned contingents (the entities of the marine activity and population of the coastal territories) should be established in all coastal entities of the Russian Federation. In the Republic of Crimea, as well as in the Kaliningrad region, only one center of the kind should be established. It looks obviously that creating new regional centers of the marine medicine in such two entities of the Atlantic

region as St. Petersburg and the Leningrad Region is not required, since it has been planned to create a National Center here, but, in any case, this should be officially stated in writing by the heads of these entities of the Russian Federation in the upcoming consideration and approval of the draft Concept.

The draft Concept for developing the marine medicine in the Atlantic region also provides for implementing a number of specific areas: diving medicine, radiation and marine hygiene, medical support of naval aviation, regional scientific and technical programs aimed at preserving and strengthening the health of the population of coastal entities, and a number of other important tasks.

Development of the diving medicine involves solving the problem of improving the regulatory framework of medical support for divers, introducing a three-tier system for providing specialized hyperbaric care, optimizing the organizational and staff structure of the units containing in the staff of special physiologists, enhancing scientific research in order to preserve the life and health of diving specialists [12, 3–96; 13, p. 90–91].

In the direction of improving the regulatory base of the diving medicine in the General Command of the Navy, a new edition of the "Manual on Search and Rescue Support of the Navy" (hereinafter the Manual) was developed; the draft document is being approved by the military authorities. In the new edition of the Manual, the medical support system has been changed, and it has been brought into line with the organizational and staff structure of the fleet's rescue teams.

In 2015, the national emergency medical guideline was published, which reflected the issues of hyperbaric oxygenation [14, p. 123–126; 15, p. 864-873]. In 2015, for the treatment of victims poisoned by carbon monoxide, the Chief of the Navy "Instructions for the treatment with oxygen under elevated pressure of carbon monoxide poisoning on submarines" was developed and approved [16, p. 3-4].

The Navy Diving Service Rules (NDS of the Navy, 2002) are actively working to determine the sequence and extent of medical care for specific occupational diseases that regulate hyperbaric oxygenation for the treatment of divers and submariners poisoned by exhaust gases [16, p. 3]. The processing of the Navy NDS will be completed by 2020 with the preparation of the final draft of the document, which is the Rules of Diving Service of the Armed Forces of the Russian Federation. In the new edition of the document in the part relating to medical support, a three-level system of the medical support for the divers is included.

In June 2018, the Commander-in-Chief of the Navy approved and published the "Instruction on medical support for diving descents to a depth of 300 meters."

An important task in developing the diving medicine in Russia is working out a unified interdepartmental approach to coordination of service activities of special physiologists. It is necessary to optimize the organizational and staffing structure of the divisions containing the staff of special physiologists and to achieve the recruitment of the posts in the specialty "Diving medicine".

Of great importance in developing the diving medicine in Russia, including in the Atlantic region, is strengthening material base of the medical units of the formations, military units and organizations whose activities are inextricably linked with the diving business.

By 2017, in the Atlantic region, in the Baltic, Black and Azov Seas, a three-tier system of specialized hyperbaric care were created and effectively used (level 1 at the site of the disease, barotrauma; level 2 in b, level 3 in a stationary decompression system "Spasiatel" designed by the Special Design Bureau of the Institute of Medical and Biological Problems of the Russian Academy of Sciences, Moscow, general director A. T. Logunov) (table).

Table

Means for specialized hyperbaric aid in rims of the Baltic, Black and Azov Seas

Means of rendering specialized hyperbaric care	Baltic Sea basin	Black and Azov Seas basin
"Kubyshka" pressure chamber diving transport of folding type	Only 5 pressure chamber: 1. Baltiysk on the basis of 342 detachments of the underwater struggle with sabotage forces and means 2. Baltiysk on the basis of the military unit 43104 3. Kronstadt - 2 pressure chambers on the basis of a submarine squad against	Only 3 decompression chambers: 1. Sevastopol, 2 pressure chambers on the basis of the 112th squadron of underwater fighting with sabotage forces and means 2. Sevastopol on the basis of the military unit 43071

	sabotage forces and means of the 105th brigade of the ships guarding the water area of the Leningrad naval base 4. Lomonosov based on the 328th expeditionary rescue squad	
"Spasitel" decompression chamber	Only 4 decompression chambers: 1. Baltiysk on the basis of 342nd rescue squad of the Baltic Fleet 2. The city of Lomonosov on the basis of the scientific research institute for rescue and underwater technologies of the VUNC Navy "Naval Academy named after N.G. Kuznetsov" 3. St. Petersburg on the basis of the Naval Polytechnic Institute VUNTs of the Navy "Naval Academy named after N.G. Kuznetsov" 4. St. Petersburg on the basis of the 1st naval clinical hospital (branch of the 442nd military clinical hospital)	Total 2 decompression chambers: 1. Sevastopol on the basis of the branch 1472 naval go clinical hospital named N.I. Pirogov 2. Sevastopol On training center for preparation of divers and diving specialists 907 United training center, Naval Fleet

The "Spasiatel decompression system to be created in 2018 and relocated from the city of Novorossiysk to the city of Sevastopol and put into operation on the basis of the Black Sea Higher Naval School named after P. S. Nakhimov.

In the interests of the Novorossiysk naval base on the basis of a training station under construction, in 2019 a new decompression system manufactured by Divevtohnoservis LLC (St. Petersburg) is to be put into operation.

In 2019, in the South Baltic in the branch No. 1 1409 of the Naval Clinical Hospital in Baltiysk, in accordance with the state contract, it is planned to install the "Spasiatel" decompression system and put it into operation in container version.

These decompression systems can provide assistance to victims of decompression sickness, mine explosive lesions, with hypothermia, poisoning with toxic substances and combustion products, for the treatment of diseases of divers, as well as to perform training diving descents and transport the affected diver from the accident site inside the "Kubyshka" decompression chamber diving transport warehouse.

In 2019, it is planned to complete work on introducing changes in the staffs of naval hospitals, taking into account the commissioned decompression systems.

In the direction of scientific research in the interests of preserving the life and health of the diving specialists, special attention was paid to the work on the adoption of a new oxygen station, as well as to the study of the problem of the use of argon mixtures for breathing divers and submarine personnel.

The interaction of the water environment with the aerial through the interaction between a ship and an aircraft was born in the Russian Navy. Perhaps that is why in Russia the process of movement of an aircraft is called aeronautics, aviation is called the air fleet, the sky is the fifth ocean, and heavy planes are called ships [17, p. 5]. The development of naval aviation from its inception to the present day, the increase in its combat capability is inextricably linked with the marine aviation medicine.

At the present stage, the development of **the medical support system for the naval aviation** in general and the Atlantic region in particular is planned by restoring the post of head of aviation medicine at the naval aviation administration of the Baltic Fleet, as already implemented in the Black Sea Fleet, as well as introducing a number of medical posts in 2019 aviation connections and parts.

Development of the domestic system of the medical support of the naval aviation is based on a number of scientific areas of research on the problems of the aerospace medicine [18, p. 9–207].

Studies by foreign experts in the field of aviation and space medicine have shown that as experience is gained and as a result of special training sessions, including in pressure chambers, it is possible to increase the ability of pilots to recognize signs of hypoxia and their willingness to use practical recommendations in the prevailing conditions.

Due to the fact that acute hypoxia can lead to loss of efficiency and consciousness by the pilot and, accordingly, to a plane crash, training in decompression chambers is an integral part of the physiological

training of the flight crews of the United States, Germany, France, and Italy. Various methods of high-altitude training have been developed and applied, including those with increased or decreased oxygen content in the inhaled air [19, p. 57–63]. In the Russian Federation, similar approaches are applied for barotherapy in the training system, as well as the integrated treatment and rehabilitation of the wounded, sick and affected both in the military unit and in the military medical organizations [20, p. 3–96].

Implementation of a set of measures for high-altitude training in pressure chambers significantly reduces the risk of an emergency due to erroneous and untimely actions of the pilot, and also contributes to his professional level and flight safety.

In the Russian Navy in 2018–2020 it is planned to equip the naval aviation of four fleets, including the Baltic and Black Sea fleets, with a modern high-altitude hypobaric module "Edelweiss", which will solve the problems of flight crew training and military flight expertise, including with respect to promising aircraft.

Such a module was commissioned in November 2017 in the 859 Combat Training and Retraining Center for Naval Aviation of the Navy in the city of Yeisk, Krasnodar Territory, and successfully passed state tests in June 2018.

HYPOBARIC MODULE "EDELWEISS"

МОДУЛЬ ГИПЕРБАРИЧЕСКИЙ БАРОКАМЕРНЫЙ «ЭДЕЛЬВЕЙС»	**DECOMPRESSION CHAMBER HYPOBARIC MODULE "EDELWEISS"**
Отсек общий (4 места)	Common compartment (4 seats)
Баллоны газовые (воздух, кислород)	Gas cylinders (air, oxygen)
Отсек перепада (1 место)	Delta compartment (1 place)
Блок барокамеры	Pressure chamber block
Насосы вакуумные с воздушным охлаждением	Vacuum pumps with air cooling
Система силового электропитания	Power supply system
Электроэнергетическая установка	Power plant
Силовой блок	Power block
Бытовой блок	Household unit
Место хранения лёгкого снаряжения	Light equipment storage place
Место врача	Place a doctor
Место оператора	Operator's place

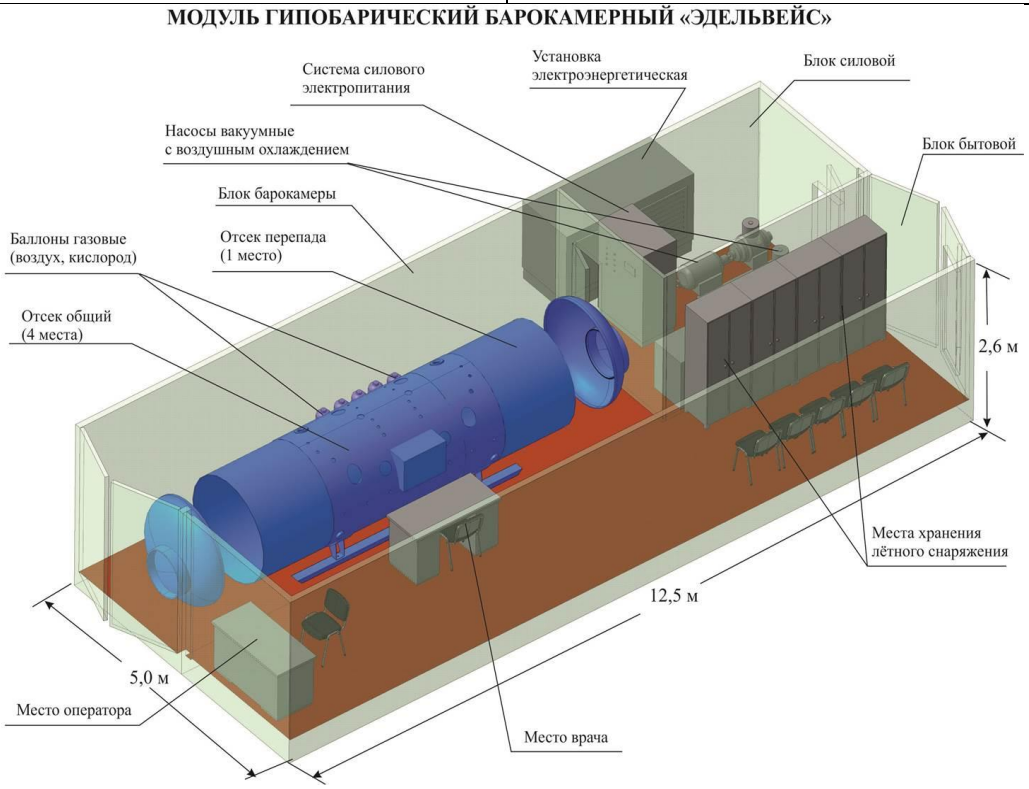

Fig. 1. Decompression chamber hypobaric module "Edelweiss"

An important direction in development of the marine medicine in the Atlantic region is **implementation of scientific and technical programs in the coastal regions** of the Atlantic region of the Russian Federation.

As an example of an implementation of this task in the Arctic zone, the long-term approach to this problem in the European North of Russia can be considered. Specifically, in the Arkhangelsk Region, for over 20 years, the regional scientific and technical program "Health of the Population of the European North of Russia" has been successfully been implementing, the last edition for 2018–2022. This program is interconnected with the scientific and technical program of the Northern State Medical University "Medical aspects of the development strategy of the Arctic zone of the Russian Federation for the period up to 2020" and formed the basis of the "Development Strategy of the Arkhangelsk Region until 2030".

In our opinion, such a program under the conditional title "**Health of the Population of the Republic of Crimea and the City of Sevastopol"** will allow successfully implementing the national marine policy of Russia in the Black Sea basin in the field of preserving and promoting the health of people working at the facilities of the marine activities achieving established health targets for a medium term a long term. A similar approach is advisable to implement in the Kaliningrad region, as wel as in St. Petersburg and the Leningrad region.

An important direction in developing the marine medicine in general and in the Atlantic region in particular is **development of the radiation and marine hygiene**. Implementation of this direction should be comprehensive and carried out both in the area of improving the regulatory framework, and in the field of undergraduate and postgraduate education, radical improvement of the educational and material base of the departments of hygiene of universities, enhancement of research on radiation and marine hygiene.

For developing the naval medicine, an extremely important condition is the restoration of the full-scale and quality teaching of the discipline "Naval and Radiation Hygiene" in the Navy and Medical Academy in the system of training a medical specialist at S.M. Kirov Military Medical Academy [21, p. 73–74].

Control checks of the medical units of the fleets in 2016–2018 showed a low level of training of officers of the medical service of ships in matters of naval and radiation hygiene, due to the elimination of the department of naval and radiation hygiene in S.M. Kirov Military Medical Academy.

The task of improving the quality of education in the field of the marine and radiation hygiene is extremely important for institutes and departments of hygiene and medical ecology of universities of the Ministry of Health of Russia, which train medical personnel for coastal constituent entities of the Russian Federation.

An important direction in development of the marine medicine is **restoration of technical readiness and the modernization of the marine hospital ships.**

Leading foreign countries pay considerable attention to development of hospital ships and amphibious assault forces. One of the main elements of the latter at the present stage are the amphibious-helicopter ships-docks (AHSD), on which the deployment of the ship hospital is possible [22, p. 52–59]. Specifically, in Italy, the company "Fincantieri" is working on the design of a new AHSD, which can be equipped with a hospital designed for 54 beds, with a project total area of 1000 m^2. If necessary, it is possible to expand it (space for installation of specialized medical module containers is about 1000 m^2). Construction of AHSD was started at the end of 2017. Launching is scheduled for 2019. Transfer to the customer is expected in 2022.

For the naval forces of Indonesia in the South Korean shipyards (the company "Dusan Shipbuilding") built two AHSD, type "Makassar"". At the same time, after upgrading, the head ship was redesigned into a hospital ship. Indonesia, having manufactured two such ships at its own shipyards, fulfills export contracts worth about $ 100 million, involving construction of two hulls of the same type for the Philippines naval forces (the headquarters was transferred to the customer in 2016) and $ 50 million for the military marine forces of Peru.

In turn, the Singaporean company "EST Engineering Marine" with the technological support of the United States is building and the subsequent maintenance of the AHSD, type "Endurance". The military composition of the national naval forces consists of four ships, and one was purchased by Thailand.

In general, AHSD due to its multifunctionality is now widely distributed and in demand, as they can solve not only combat, but also humanitarian tasks. They are part of the naval forces of many foreign countries (USA, United Kingdom, France, Italy, Spain, the Netherlands, China, Japan, the Republic of Korea, the Philippines, Singapore, Thailand, Indonesia, Peru, Algeria and Egypt). This also contributes to their relatively low cost. Plans for the acquisition of AHSD exist in Germany, India and several other countries [22, p. 59].

In humanitarian operations, in addition to AHSD, the marine hospital ships (hereinafter referred to as MHS) are widely used. Currently, the Russian Navy consists of three MHS: the Irtysh in the Pacific Fleet, the Svir in the Northern Fleet and the Yenisei in the Black Sea Fleet. Technically regularly and partially modernized the Irtysh MHS, which in 2017 successfully completed the tasks of providing medical support to the naval group of the Russian Navy off the coast of the Syrian Arab Republic. In the coming years, all three vessels will be overhauled and upgraded and will be used by the fleet until 2030.

The issue of building new hospital ships in Russia is being studied, as well as the use of promising logistics support vessels in the interests of the medical service of the fleets.

The MHS can be used not only for its intended purpose, that is, for medical support of force groupings in the far sea zone, but also for medical support of forces and troops performing tasks outside the territory of the Russian Federation, assisting the population in humanitarian disasters, in remote settlements on islands and the coast, to workers at the sites of marine activities, including in the Atlantic region, as well as medical and psychological rehabilitation of flight personnel during long marches of aircraft carrying ships .

Implementation of the concept of development of the marine medicine on the Atlantic main regional direction of the national marine policy of Russia for a medium term and a long term is carried out by solving several strategic objectives, several strategic development vectors: diversification growth, integration growth, innovation, program, market, environmental, educational, and multidisciplinary .

Of course, this division is conditional, all these strategic areas are closely interrelated and have mutual influence on each other, but this division allows its considerer to systematize the work and specify the objectives for developing the marine medicine in the Atlantic region.

Thus, one of the most important achievements in the implementation of **the strategy of diversifying the growth of marine medicine** is development and inclusion of provisions for its creation, including in the Atlantic region of the Russian Federation, in approved and implemented state strategic planning documents, such as:

1. The Marine Doctrine of the Russian Federation, approved by the President of the Russian Federation on June 17, 2015;

2. The fundamentals of the state policy in the field of naval activities of the Russian Federation for the period until 2030, approved by Decree of the President of the Russian Federation No. 327 of July 20, 2017. In particular, article 29, paragraph h) defines the main tasks of the state in the area of naval activities for its subarea of social security and staffing the Navy and the federal security service, in particular, determines development of the system of medical support for military personnel and their families, civilian personnel of the Military Navy-Navy and the Federal Security Service [23, p. 3, 154].

In addition, the provisions for developing the marine medicine are included in the state strategic planning documents developed and prepared for approval, as well as the documents being developed, such as:

1) the draft Federal Law “On State Administration of the Marine Activities in the Russian Federation”;

2) the project “Development Strategy for the Marine Activity of the Russian Federation until 2030”;

3) and the draft Federal Law “On Search and Rescue Support for the Marine Activities of the Russian Federation”.

Developing the provisions of the marine medicine has been laid down in the Marine Doctrine, in the following fundamental documents — “The Basics of State Policy in the Field of Naval Activities of the Russian Federation for the Period up to 2030”, the draft Federal Law “On State Administration of Marine Activities in the Russian Federation”, the “Strategy for the Development of the Marine Activity of the Russian Federation until 2030”, and, of course, the Concept for Development of the Marine Medicine in the Russian Federation until 2030 — so, it is necessary to redevelop and present these provisions for approval by the country’s leadership offers medical and social issues, providing care of the state of man labor sea, the people living in the Russian coastal regions.

Implementation of these priority directions for developing the national and regional health care system, including its marine component, is to ensure a further increase in accessibility and quality of medical care, significantly enhancing the population’s satisfaction with provision of such a care, and generally improving demographic indicators in the Atlantic region.

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